

REMARKS

Claims 1-19 have been withdrawn from consideration. Claims 20-23 stand rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 6,478,972 to Shim et al. in view of U.S. Patent No. 5,961,879 to Trigiante. Applicants respectfully traverse this rejection for the following reasons.

The present invention is directed to a method of controlling the growth of microorganisms that includes steps of (1) preparing stabilized alkali or alkaline earth metal hypochlorite with a pH of at least 11, (2) preparing a bromide ion source and (3) sequentially or simultaneously introducing the stabilized alkali or alkaline earth metal hypochlorite and the bromide ion source into a habitat of microorganisms to raise the level of residual halogen to 0.1-10 ppm. The prior art of record does not teach or suggest controlling pH in the process of preparing a biocide for controlling microorganisms.

The Shim patent is directed to a method of controlling microbial fouling by stabilizing a solution of hypochlorous acid and adding an ion bromide source to the stabilized hypochlorous acid. The stabilized hypochlorous acid is believed to function as a reservoir of Br^+ for the formation of hypobromous acid (HOBr). See col. 6, lines 1-20. The hypochlorite does not stoichiometrically react with the bromide ion source. Instead the hypochlorite is used to form HOBr. The process of the Shim patent achieves residual free halogen at levels of 0.05-10 ppm. See col. 8, lines 22-27.

The Shim patent does not teach the importance of the order of reagent addition or suggest or teach controlling pH. The Trigiante patent is relied upon for its disclosure of controlling pH in a hypochlorite bleaching composition. However, there is no motivation provided by either reference to control pH in the process of the Shim patent.

The Shim patent already discloses a process of producing an antimicrobial composition having residual halogen at 0.1-10 ppm for up to 7 days. Accordingly, there is no motivation provided therein to control pH for the purpose of controlling the growth of microorganisms by maintaining a maximum residual halogen content.

Despite this, Applicants discovered that both initial biocide activity and maintenance of biocide activity for a period of time can be achieved by controlling the release rate of free residual halogen through suitable control of pH. See page 8, line 14 to page 9, line 2 of the present specification. By maintaining the pH at 11 or more, the alkali

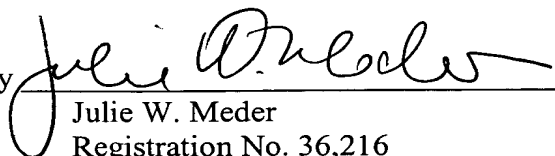
solution is prevented from being neutralized by the acidic stabilizer. If the alkali solution is neutralized at lower pH, the equilibrium state of the reaction is disturbed and the reaction proceeds to generate chlorine gas, which then reduces the amount of chlorine available for the reaction. See p. 10, line 14 to p.11, line 19 of the present specification. At lower pH, stabilized hypobromite is formed; at higher pH, stabilized hypochlorite is formed. (See, for example, page 19, lines 10-23 reporting the production of Biocide C and Biocide D.)

Nothing in the Trigiante patent suggests the need to control pH in the method of the Shim patent. The Trigiante patent discloses a process for manufacturing a bleaching composition which is stabilized at pH 10-14. Heavy metal ions in a bleaching composition are controlled by using a process wherein a precipitating agent is added to hypochlorite and a strong source of alkalinity in the presence of tap water to form precipitates that are then separated and removed. This teaching to stabilize a bleaching composition at high pH does not suggest that the process of the Shim patent should be conducted at high pH. The Shim patent already discloses stabilization of the hypochlorite solution; there is no motivation to modify the stabilization thereof by maintaining high pH per Trigiante.

In the absence of some motivation to combine the teachings of these references, a *prima facie* case of obviousness has not been established. Accordingly, claims 20-23 define over the prior art of record and are in condition for allowance.

Respectfully submitted,

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